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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,453	07/22/2003	Edison Lao Ting	SVL920030029US1	1452

45727 7590 05/01/2006

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EXAMINER	
KROFCHECK, MICHAEL C	

ART UNIT	PAPER NUMBER
2186	

DATE MAILED: 05/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/604,453	TING ET AL.	
	Examiner	Art Unit	
	Michael Krofcheck	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *21-26* is/are allowed.

6)☒ Claim(s) *1,3-10,12-20 and 27-29* is/are rejected.

7)☒ Claim(s) *2,11 and 18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/24/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to application 10/604,453 filed on 7/22/2003.

2. Claims 1-29 have been submitted and examined.

Information Disclosure Statement

3. The document entitled, "An optimality proof of the LRU-K page replacement algorithm" from the information disclosure statement filed 7/28/2003 has not been considered because it fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 17-20, 27-29 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

6. Claims 17-20, 27-29 are directed towards "an article of manufacture comprising computer usable medium having computer readable program code embodied therein..." but do not claim any the "computer usable medium having computer readable program code embodied therein" being executed on a computer or processor, and therefore fails to accomplish a practical application or a useful, concrete, and tangible result. Since

the claimed limitations do not include the hardware to realize the claimed functionality, the "computer usable medium having computer readable program code embodied therein" cannot be executed, and thus it fails to produce a useful, concrete, and tangible result.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 3, 8, 10, 16-20 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. The terms "minimum step", "minimum level", "maximum step", and "maximum level" in claims 3, 10, 17, are relative terms which renders the claim indefinite. The terms are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

10. Additionally, the above terms render claims 3, 10, 17 indefinite because it is unclear what they are referring to, i.e. a minimum level or step of what?

11. Claim 8, 16 recites the limitation "said across network element" in lines 1-2 of each claim. There is insufficient antecedent basis for this limitation in the claim.

12. The claims not specifically mentioned are rejected because of their dependency

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 1, 3, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vitter et al, US patent 5485609 and Kuwata, US patent application publication 2003/0079087.

17. With respect to claim 1, Vitter teaches of a system prefetching and replacing pages in storage, said storage retaining a plurality of pages, each of said pages comprising a plurality of nodes grouped into one or more regions, said system comprising: (a) a memory management system storing a variable set of pages in memory (fig. 3-4; column 5, lines 33-36);

(b) a prefetcher recognizing access patterns and usage and prefetching pages among said plurality of pages that fit said access patterns and usage (fig. 3-4, item 8, 103; column 5, lines 7-32); and

(c) a page replacer working in conjunction with said memory management system, and during a traversal, weighting said variable set of pages to identify a subset to be retained and a remainder to be replaced (column 5, lines 40-47; where a version of the LRU heuristic is used),

said subset including pages having a high probability of being revisited (column 5, lines 40-47; where the prefetched pages are marked as most recently used with the more probable pages) and

said remainder replaced with a page corresponding to said traversal (column 5, lines 40-47; where the least recently used pages are replaced by the prefetched pages), and

Kuwata teaches of said weighting based upon one or more of the following numerical values associated with each page in said variable set of pages: number of children, number of parents, and region statistics (fig. 3; items 315, 316; paragraph 0063; minimum number of pages is equivalent to region statistics).

Vitter and Kuwata are analogous arts as they are both in the same field of endeavor, memory management. It would have been obvious to one of ordinary skill in the art having the teachings of Vitter and Kuwata at the time of the invention to incorporate the process of limiting the number of cached pages by a minimum number of pages in a port dedicated link in Vitter as taught in Kuwata. Their motivation would have been to improve the performance of the running application (Kuwata, paragraph 0064).

18. With respect to claim 3, Kuwata teaches of wherein said region statistics are any of, or a combination of, the following: minimum step, minimum level, maximum step, or maximum level (fig. 3; items 315, 316; paragraph 0063; minimum number of pages).

19. With respect to claim 6, Vitter teaches of wherein said regions are node descendant regions (fig. 1; where the third descendant oval shaped node has three descendant leaf nodes. those three leaf nodes can be grouped as a node descendant region).

20. Claims 1, 3, 6 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Vitter et al, US patent 5485609 and Vuskovic, "chapter 5: Virtual Memory," Operating Systems.

21. With respect to claim 1, Vitter teaches of the same limitations cited above. Vuskovic teaches of said weighting based upon one or more of the following numerical values associated with each page in said variable set of pages: number of children, number of parents, and region statistics (page 5-11; where with the N-th chance algorithm a counter is associated with each page and while the counter for the page is below the set value the page is not replaced (regional statistics)).

Vitter and Vuskovic are analogous arts as they are both in the same field of endeavor, memory management. It would have been obvious to one of ordinary skill in the art having the teachings of Vitter and Vuskovic at the time of the invention to incorporate N-th chance algorithm for page replacement in Vitter as taught in Vuskovic. Their motivation would have been to improve performance by implementing an efficient replacement algorithm.

22. With respect to claim 3, Vuskovic teaches of wherein said region statistics are any of, or a combination of, the following: minimum step, minimum level, maximum step, or maximum level (page 5-11; where the N-change algorithm is based on the value N which is the minimum number of faults or examinations induced by a fault that each page much receive before being replaced (minimum step/minimum level)).

23. With respect to claim 6, Vitter teaches of wherein said regions are node descendant regions (fig. 1; where the third descendant oval shaped node has three descendant leaf nodes. those three leaf nodes can be grouped as a node descendant region).

24. Claim 9-10, 14, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vitter et al, US patent 5485609, Kuwata US patent application publication 2003/0079087 and Flinchem et al., US patent 6307548.

25. With respect to claim 9, Vitter teaches of a method for robustly prefetching and replacing pages in a system storing a plurality of pages, each of said stored pages comprises a plurality of nodes grouped into one or more regions, said method comprising the steps of:

(a) storing a variable set of pages in memory (fig. 3-4; column 5, lines 33-36);

(b) recognizing access patterns and usage and prefetching pages among said plurality of pages that fit said access patterns and usage (fig. 3-4, item 8, 103; column 5, lines 7-32);

(c) upon traversals within said plurality of pages: (i) retaining a subset of said variable set to include pages having a high probability of being revisited (column 5, lines 40-47; where the prefetched pages are marked as most recently used with the more probable pages); and

(ii) dynamically replacing remainder of said variable set with a page corresponding to said traversal (column 5, lines 40-47; where the least recently used pages are replaced by the prefetched pages);

wherein, during each of said traversals, said variable set of pages is weighted to identify said subset to be retained and said remainder to be replaced (column 5, lines 40-47; where a version of the LRU heuristic is used),

Kuwata teaches of said weighting based upon the following numerical values associated with each page in said variable set of pages: region statistics (fig. 3; items 315, 316; paragraph 0063; minimum number of pages is equivalent to region statistics).

Flinchem teaches of weighting based upon the following numerical values: number of children, number of parents (column 28, lines 10-20).

The combination of Vitter and Kuwata, and Flinchem are analogous arts as they both involve weighting objects. It would have been obvious to one of ordinary skill in the art having the teachings of Vitter, Kuwata, and Flinchem at the time of the invention to include in weighing the pages in the combination of Vitter and Kuwata, weighing them based on the number of child and parent pages as taught in Flinchem. Their motivation would have been to provide a better idea of those that are less likely to be needed in the future.

26. With respect to claim 10, Kuwata teaches of the limitations cited above with respect to claim 3.

27. With respect to claim 14, Vitter teaches of wherein said regions are node descendant regions (fig. 1; where the third descendant oval shaped node has three descendant leaf nodes. those three leaf nodes can be grouped as a node descendant region).

28. With respect to claim 17, the combination of Vitter, Kuwata, and Flinchem teach of the limitations cited above with respect to claim 9.

Additionally, the combination of Vitter, Kuwata, and Flinchem teaches of a computer usable medium having a computer readable program code embodied thereon

since the cited limitations occur within a computer system, they must be carried out by a processor (or processors) which are executing code retrieved from a memory.

Additionally, Kuwata reaches of said weighting based upon the following numerical values associated with each page in said variable set of pages: minimum step, and minimum level (fig. 3; items 315, 316; paragraph 0063; minimum number of pages (minimum step and level)).

29. Claim 9-10, 14, 17 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Vitter, Vuskovic, and Flinchem et al., US patent 6307548.

30. With respect to claim 9, Vitter teaches of the limitations cited above; Vuskovic teaches of the limitations cited above with respect to claim 1; and Flinchem teaches of the limitations cited above.

The combination of Vitter and Vuskovic, and Flinchem are analogous arts as they both involve weighting objects. It would have been obvious to one of ordinary skill in the art having the teachings of Vitter, Vuskovic, and Flinchem at the time of the invention to include in weighing the pages in the combination of Vitter and Vuskovic, weighing them based on the number of child and parent pages as taught in Flinchem. Their motivation would have been to provide a better idea of those that are less likely to be needed in the future.

31. With respect to claim 10, Vuskovic teaches of the limitations cited above with respect to claim 3.

32. With respect to claim 14, Vitter teaches of wherein said regions are node descendant regions (fig. 1; where the third descendant oval shaped node has three

descendant leaf nodes. those three leaf nodes can be grouped as a node descendant region).

33. With respect to claim 17, the combination of Vitter, Vuskovic, and Flinchem teach of the limitations cited above with respect to claim 9.

Additionally, the combination of Vitter, Vuskovic, and Flinchem teaches of a computer usable medium having a computer readable program code embodied thereon since the cited limitations occur within a computer system, they must be carried out by a processor (or processors) which are executing code retrieved from a memory.

Additionally, Vuskovic reaches of said weighting based upon the following numerical values associated with each page in said variable set of pages: minimum step, and minimum level (page 5-11; where the N-change algorithm is based on the value N which is the minimum number of faults or examinations induced by a fault that each page much receive before being replaced (minimum step and level)).

34. Claims 7-8, and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vitter and Kuwata; and Vitter and Vuskovic as applied to claim 1 and Vitter, Kuwata, and Flinchem; and Vitter, Vuskovic, and Flinchem as applied to claim 9, and further in view of Martin et al., US patent 6154813.

35. With respect to claim 7 and 15, the combinations of Vitter and Kuwata, Vitter and Vuskovic, Vitter, Kuwata, Flinchem, and Vitter, Vuskovic, Flinchem fail to specifically teach of wherein said system/method is implemented across networks.

However, Martin teaches of wherein said system/method is implemented across networks (fig. 1; column 3, lines 32-43).

The combination of Vitter and Kuwata, and Martin are analogous arts as they are both in the same field of endeavor, memory management. It would have been obvious to one of ordinary skill in the art having the teachings of Vitter, Kuwata, and Martin at the time of the invention to include the connections to the internet, dedicated data lines, or cellular networks in the combination of Vitter and Kuwata as taught in Martin. Their motivation would have been optimize performance of a server being accessed by multiple clients by eliminating the need separate local servers (Martin, column 1, line 65-column 2, line 5).

The combination of Vitter and Vuskovic, and Martin are analogous arts as they are both in the same field of endeavor, memory management. It would have been obvious to one of ordinary skill in the art having the teachings of Vitter, Vuskovic, and Martin at the time of the invention to include the connections to the internet, dedicated data lines, or cellular networks in the combination of Vitter and Vuskovic as taught in Martin. Their motivation would have been optimize performance of a server being accessed by multiple clients by eliminating the need separate local servers (Martin, column 1, line 65-column 2, line 5).

The combination of Vitter, Kuwata, and Flinchem and Martin are analogous arts as they are both in the same field of endeavor, memory management. It would have been obvious to one of ordinary skill in the art having the teachings of Vitter, Kuwata, Flinchem, and Martin at the time of the invention to include the connections to the internet, dedicated data lines, or cellular networks in the combination of Vitter, Kuwata, and Flinchem as taught in Martin. Their motivation would have been optimize

performance of a server being accessed by multiple clients by eliminating the need separate local servers (Martin, column 1, line 65-column 2, line 5).

The combination of Vitter, Vuskovic, and Flinchem and Martin are analogous arts as they are both in the same field of endeavor, memory management. It would have been obvious to one of ordinary skill in the art having the teachings of Vitter, Vuskovic, Flinchem and Martin at the time of the invention to include the connections to the internet, dedicated data lines, or cellular networks in the combination of Vitter, Vuskovic, and Flinchem as taught in Martin. Their motivation would have been optimize performance of a server being accessed by multiple clients by eliminating the need separate local servers (Martin, column 1, line 65-column 2, line 5).

36. With respect to claims 8 and 16, Martin teaches of wherein an across network element is any of the following: local area network, wide area network, the Internet, cellular network, or wireless network (fig. 1; column 3, lines 32-43).

37. Claims 4-5, 12-13, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vitter and Kuwata; and Vitter and Vuskovic as applied to claim 1 and Vitter, Kuwata, and Flinchem; and Vitter, Vuskovic, and Flinchem as applied to claim 9 and 17, and further in view of Darugar, US patent application publication 2003/0018661.

38. With respect to claim 4, 12, 19 the combinations of Vitter and Kuwata, Vitter and Vuskovic, Vitter, Kuwata, Flinchem, and Vitter, Vuskovic, Flinchem fail to specifically teach of wherein said plurality of nodes are associated with a mark-up language based document.

However, Darugar teaches of a plurality of nodes are associated with a mark-up language based document (paragraph 0058).

It would have been obvious to one of ordinary skill in the art having the teachings of Vitter, Kuwata and Darugar at the time of the invention to incorporate the Document Object Model representation of documents into the combination of Vitter and Kuwata as taught in Darugar. Their motivation would have been to represent an XML document as a database, thus allowing updating in a similar manner to data base updating which is more straight forward.

It would have been obvious to one of ordinary skill in the art having the teachings of Vitter, Vuskovic, and Darugar at the time of the invention to incorporate the Document Object Model representation of documents into the combination of Vitter, and Vuskovic, as taught in Darugar. Their motivation would have been to represent an XML document as a database, thus allowing updating in a similar manner to data base updating which is more straight forward.

It would have been obvious to one of ordinary skill in the art having the teachings of Vitter, Kuwata, Flinchem and Darugar at the time of the invention to incorporate the Document Object Model representation of documents into the combination of Vitter Kuwata, and Flinchem as taught in Darugar. Their motivation would have been to represent an XML document as a database, thus allowing updating in a similar manner to data base updating which is more straight forward.

It would have been obvious to one of ordinary skill in the art having the teachings of Vitter, Vuskovic; Flinchem and Darugar at the time of the invention to incorporate the

Document Object Model representation of documents into the combination of Vitter, Vuskovic, and Flinchem as taught in Darugar. Their motivation would have been to represent an XML document as a database, thus allowing updating in a similar manner to data base updating which is more straight forward.

39. With respect to claims 5, 13, 20, Darugar teaches of wherein said mark-up based language is XML (paragraph 0058).

Allowable Subject Matter

40. Claims 21-26 allowed.

41. Claims 27-29 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 101, set forth in this Office action.

42. Claims 2, 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

43. Claim 18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, and 35 U.S.C. 101 set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

44. The following is a statement of reasons for the indication of allowable subject matter:

a. With respect to independent claims 21 and 27 the prior art of Vitter, Kuwata, Vuskovic, and Flinchem teaches of the limitations of claims 21 and 27 except for said weighting based upon ***at least*** the following: number of children,

number of parents, ***traversals that are not strictly parent-to-child or child-to-parent***, and region statistics.

Conclusion

45. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

46. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Krofcheck whose telephone number is 571-272-8193. The examiner can normally be reached on Monday - Friday.

47. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

48. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael C. Krofcheck

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